ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

via e-mail

February 25, 2016
FPU16-179

Ms. Catherine Jerrard
AFCEC/CIBW
706 Hangar Road
Rome, NY 13441

RE: WAFB – ADEQ Comments – ST012 - *Draft Soil Vapor Extraction System/Steam Enhanced Extraction System [SVE / SEE] Operation and Maintenance [O&M], 2015 First Quarter [1Q15] Performance Report, Former Liquid Fuels Storage Area, Site ST012, Former Williams Air Force Base, Mesa, Arizona*; prepared for Air Force Civil Engineer Center AFCEC/CIBW, Lackland AFB, Texas; prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., Phoenix, Arizona; document dated December 16, 2015

Dear Ms. Jerrard:

Arizona Department of Environmental Quality (ADEQ) Federal Projects Unit (FPU) and ADEQ contractors UXO Pro, Inc. and Praxis Environmental reviewed the referenced document. General and Specific Comments are provided below.

General Comments

1. ADEQ remains concerned that the contaminant plume is not characterized. See Specific Comments 12 through 16 below.

2. Elevated benzene concentrations in perimeter monitoring wells and steam injection on the TTZ perimeter as reported continue to be points of concern that indicate a lack of sufficient containment of injected fluids that may result in the adverse migration of NAPL away from extraction wells.

Specific Comments:

1. Page 3-8, Line 881. Please complete the final sentence explaining the TMP array damage.

2. Page 3-10. Please separate Graph 3-1 into two separate plots, one with untreated stream readings and the second with the readings from the thermal accelerator discharges. Both graphs can then be plotted on a linear scale to display more detail.

3. Please resolve the following inconsistency:
    - Page 3-11, Line 955 states *"Vapor flow rate is continuously logged at the vapor extraction blower discharge to monitor the wellfield vapor extraction rate. Graph 3-3 presents the daily average noncondensible vapor extraction rate, the steam extraction rate, and total vapor extraction rate since startup."*
    - Page 3-12, Line 964 states *"The wellfield flow rate is calculated by taking the daily average flow rate going to the thermal accelerators and subtracting the daily average effluent flow rate from the air strippers in order to estimate flow coming from the wellfield vapor only."*

    a. Is the wellfield flow rate not equal to the vapor extraction blower discharge?
    b. What other sources of vapor extraction exist?
    c. Please provide a graph showing the effluent flow rates from the air strippers and the influent flow rates to the thermal accelerators.

4. Page 3-12, Line 979. *"The cumulative water extraction is calculated based on totalized flow via flow meters installed at each of the 57 extraction wells... Each flow meter has an accuracy of ±1.0% according to the manufacturer. When compared to the measured air stripper influent flow rate, the variation is around 20%."*
    a. Do the individual flow meters provide both instantaneous flow rate and total flow?
    b. If so, which values (rate or total) from the educator inlet and outlet are used to calculate the flow rates and cumulative flows presented in Graphs 3-4 and 3-5?

5. Page 3-21, Table 3-3. Please include a measured vapor flow rate at each location close to the time of sample collection to allow a calculation of compound mass flow rates.

6. Page 3-24, Table 3-4. Please include a measured water flow rate at each location close to the time of sample collection to allow a calculation of compound mass flow rates.

7. Page 3-47, Line 1313. *"A correction factor is applied to thermal accelerator influent PID readings (presented in Graph 3-1) based on corresponding thermal accelerator influent analytical data (results presented in Table 3-3)."* Please include a table of the correction factors applied for the various time intervals alongside the associated analytical data.

8. Page 3-49, Table 3-10.
    a. Please include a calculation of the mass dissolved in the water entering the air stripper. This mass is calculated by multiplying the water flow rate (provided in Appendix L) times the measured concentration (provided in Table 3-4). The mass extracted in the vapor phase from the wellfield is then estimated by subtracting the air stripper influent mass from the mass entering the thermal accelerator. Hence, Table 3-10 can report three mechanisms of mass removal: mass dissolved in water, mass volatilized into vapors, and mass in recovered LNAPL.
    b. The data are available (Tables 3-3 and 3-4) to perform calculations of benzene mass removal in addition to the total hydrocarbon mass removal currently reported in Table 3-10. Please add a column for benzene.

9. Section 3.3.2 Containment Evaluations. This section should include an energy balance that is equivalent to a volume balance. As the steam zone grows, a large mass of liquid water is displaced by a small mass of water vapor in the steam zone and the displaced liquid water should be accounted for in the mass balance. As a result, Graph 3-21 is insufficient to demonstrate containment. In addition, site heterogeneity and changes in water viscosity with temperature are not accounted for in the containment evaluation.

10. Section 3.3.2 Containment Evaluations. Comments 23 through 27 provided on the first quarterly report for SEE remain unaddressed and are included here by reference.

11. Page 3-50, Lines 1358-1371. The discussion of perimeter well benzene concentrations should be moved to a separate subsection under Section 3.3.2 Containment Evaluations.

12. Page 3-50, Line 1365. "Benzene concentrations in ST012-W30 and ST012-W36 are consistent with concentrations historically seen in those wells and may indicate the presence of residual LNAPL in the vicinity of those wells." Please provide a plan to investigate the occurrence of NAPL in this area.

13. Page 3-50, Lines 1367-1371. The text states the increased benzene concentrations in well W34 do not appear to be related to loss of steam containment. If, as the text states, hydraulic control is being maintained in this area, then it appears there may be areas of higher benzene concentrations in the vicinity that are not adequately characterized. Please provide a plan for further plume characterization in this area.

14. Appendix L. Please include units with the column headers in Appendix L. Also provide notation for the location of measures consistent with designations in the Process Flow Diagram in Appendix C of the Work Plan.

Closure

ADEQ may add or amend comments if evidence to the contrary of our understanding is discovered; if received information is determined to be inaccurate; if any condition was unknown to ADEQ at the time this document was signed; or if complementary regulatory agencies bring valid and proven concerns to our attention.

Thank you for the opportunity to comment. Should you have any questions regarding this correspondence, please contact me by phone at (602) 771-4121 or e-mail miller.wayne@azdeq.gov.

Sincerely,

Wayne Miller
ADEQ Project Manager, Federal Projects Unit
Remedial Projects Section, Waste Programs Division

cc:

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